IN THE CLAIMS

The following is a complete list of the claims now pending; this listing replaces all earlier versions and listings of the claims.

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Claim 1 (currently amended): A method of interpolating a first set of discrete sample values to generate a second set of discrete sample values using one of a plurality of interpolation kernels, wherein the interpolation kernel is selected depending on an edge strength indicator, an edge direction indicator and a local contrast indicator for each of the discrete sample values of the first set, <u>the local contrast indicator being used to indicate text regions represented by the first set of discrete sample values in order to optimize the selection of the interpolation kernel</u>.

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Claim 2 (previously presented): The method according to claim 1, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 3 (currently amended): The method according to claim 1, wherein the plurality of kernels are given by:

$$\underline{h(s_x, s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h((1-2\theta/\pi)s_x + (2\theta/\pi)s_y)_{c=0.5}\cdot h(((2\theta/\pi)s_x + (2\theta/\pi-1)s_y)w(\theta))_{c=0}\right\}}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y\right)_{c=0.5}\cdot h(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\}$$

and wherein $h(s)$ is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and $\cdot$ indicates matrix multiplication.

Claim 4 (previously presented): The method according to claim 1, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < |s| \le d \\ 0, (1 - d) \ge s > (1 - d) \\ 2\left|\frac{s - d}{1 - 2d}\right|^3 - 3\left|\frac{s - d}{1 - 2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein h(s) is a modified cubic kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

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Claim 5 (previously presented): The method according to claim 1, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 6 (canceled)

Claim 7 (previously presented): The method according to claim 1, wherein one or more of the indicators are processed using a morphological process.

Claim 8 (previously presented): The method according to claim 1, wherein the selection of the interpolation kernel is performed using a kernel selection map processed in accordance with a morphological process.

Claim 9 (canceled)

Claim 10 (currently amended): A method of interpolating image data, said method comprising the steps of:

accessing a first set of discrete sample values of the image data;

calculating kernel values for each of the discrete sample values using one of a plurality of kernels depending upon an edge orientation indicator, an edge strength indicator, and a local contrast indicator for each of the discrete sample values, wherein the local contrast indicator is used to indicate text regions represented by the first set of discrete sample values in order to optimize selection of the interpolation kernel used to calculate the kernel values; and

convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 11 (previously presented): The method according to claim 10, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 12 (previously presented): The method according to claim 10, wherein the plurality of kernels are given by:

$$h(s_x, s_y)_{0\leq\theta\leq\pi/2} = \frac{1}{\sqrt{2}}\left\{h((1-2\theta/\pi)s_x + (2\theta/\pi)s_y)_{c=0.5} \cdot h(((2\theta/\pi)s_x + (2\theta/\pi - 1)s_y)w(\theta))_{c=0}\right\}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi - 1)s_x + (2\theta/\pi - 2)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi - 2)s_x + (1 - 2\theta/\pi)s_y)w(\theta))_{c=0}\right\},$$

and wherein h(s) is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 13 (previously presented): The method according to claim 10, wherein the plurality of kernels are given by:

$$h(s)=\begin{cases}(2-\frac{3}{2}b-c)|s|^3+(-3+2b+c)|s|^2+(1-\frac{1}{3}b), & |s|\le 1\\ (-\frac{1}{6}b-c)|s|^3+(b+5c)|s|^2+(-2b-8c)|s|+(\frac{4}{3}b+4c), & 1<|s|\le 2\\ 0, & Otherwise\end{cases}$$

$$h(s)=\begin{cases}1, -d<s\le d\\ 0, (1-d)\ge s>(1-d)\\ 2\left|\frac{s-d}{1-2d}\right|^3-3\left|\frac{s-d}{1-2d}\right|^2+1,\end{cases}$$

$$h(s_x,s_y)_{\theta=0}=\frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5}\cdot h(s_y)_{c=0}\right\}$$

$$h(s_x,s_y)_{\theta=\pi/2}=\frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0}\cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x,s_y)_{\theta=\pi/4}=\frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x+s_y}{2}\right)_{c=0.5}\cdot h\left(\frac{s_x-s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x,s_y)_{\theta=3\pi/4}=\frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x+s_y}{\sqrt{2}}\right)_{c=0}\cdot h\left(\frac{s_x-s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

Claim 14 (previously presented): The method according to claim 10, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 15 (currently amended): An apparatus for interpolating image data, said apparatus comprising:

means for accessing a first set of discrete sample values of the image data;

calculator means for calculating kernel values for each of the discrete sample values using one of a plurality of kernels depending upon an edge orientation indicators, an edge strength indicator, and a local contrast indicator for each of the discrete sample values, wherein the local contrast indicator is used to indicate text regions represented by the first set of discrete sample values in order to optimize selection of the interpolation kernel used to calculate the kernel values; and

convolution means for convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 16 (previously presented): The apparatus according to claim 15, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 17 (currently amended): The apparatus according to claim 15, wherein the plurality of kernels are given by:

$$h(s_x,s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5}\cdot h\left(((2\theta/\pi)s_x + (2\theta/\pi-1)s_y)w(\theta)\right)_{c=0}\right\}$$

$$h(s_x,s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y\right)_{c=0.5}\cdot h\left(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta)\right)_{c=0}\right\}$$

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and $\cdot$ indicates matrix multiplication.

Claim 18 (previously presented): The apparatus according to claim 15, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

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$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling

distances in the horizontal and vertical directions, respectively, and · indicates matrix multiplication.

Claim 19 (previously presented): The method according to claim 15, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claim 20 (currently amended): A computer readable medium for storing a program for an apparatus which processes data, said processing comprising a method of interpolating image data, said program comprising:

code for accessing a first set of discrete sample values of the image data;

code for calculating kernel values for each of the discrete sample values using one of a plurality of kernels depending upon an edge orientation indicator, an edge strength indicator, and a local contrast indicator for each of the discrete sample values of the first set, wherein the local contrast indicator is used to indicate text regions represented by the first set of discrete sample values in order to optimize selection of the interpolation kernel used to calculate the kernel values; and

code for convolving the kernel values with the discrete sample values to provide a second set of discrete sample values.

Claim 21 (previously presented): The computer readable medium according to claim 20, wherein the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

Claim 22 (previously presented): The computer readable medium according to claim 20, wherein the plurality of kernels are given by:

$$h(s_x,s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5} \cdot h\left(((2\theta/\pi)s_x + 2\theta/\pi - 1)s_y)w(\theta)\right)_{c=0}\right\}$$

$$h(s_x,s_y)_{\pi/2\le\theta\le\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi)s_x + (2\theta/\pi - 2)s_y\right)_{c=0.5} \cdot h\left(((2\theta/\pi)s_x(1-2\theta/\pi)s_y)w(\theta)\right)_{c=0}\right\}$$

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication.

Claim 23 (previously presented): The computer readable medium according to claim 20, wherein the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=0} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein *h(s)* is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

Claim 24 (previously presented): The computer readable medium according to claim 20, wherein the first set of discrete sample values are at a different resolution to the second set of discrete sample values.

Claims 25-104 (canceled)